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Enzootic caused by *Psilotrema oligoon (Trematoda: Psilostomatidae)* in young geese

Enzoocja wywołana przez *Psilotrema oligoon (Trematoda: Psilostomatidae)* u młodych gęsi

Two dead young geese coming from the village of Nasiłów, Puławy were sent to be examined at the Veterinary Institute at Puławy in May 1956. A post-mortem revealed changes in the alimentary tract of the geese which might suggest coccidiosis, although they were not quite typical of this disease. Coprological examinations and the examinations of the scrapings of the mucous membranes of the alimentary tract excluded the possibility of coccidiosis, while in the content of the small intestine numerous small flukes were found which were imperceptible by the unarmed eye when the post-mortem was performed. It appeared that they were very rare flukes of the species *Psilotrema oligoon* (Linstow, 1887) Odhner, 1913 of the family *Psilostomatidae* Odhner, 1913. It follows from the literature available to me that so far they have been found twice in Germany (Linstow, 1887 — in the intestine of the moor-hen *Gallinula chloropus;* Mühling, 1898 — in the intestine of the white-eyed pochard *Nyroca nyroca)* and once in France (Mathias, 1925 — experimentally bred from a cercaria). While describing these parasites, the authors do not mention their pathogenicity.

Bacteriological examinations of blood and internal organs, i. e. the liver and spleen, were also made in order to establish for certain the cause of the death of the geese. These examinations however yielded negative results and so the mass invasion of the flukes in question was regarded as the reason for the death of the birds examined. Own description of the parasite, based on the measurements of ten fluke specimens and supplemented with the observation of the organs of over thirty other specimens, is given below.

Psilotrema oligoon (Linstow, 1887) Odhner, 1913

Synonyms: *Distomum oligoon* Linstow, 1887; *Distomum spiculigerum* Mühling, 1898; *Distoma spiculigerum* Mühling, 1898 in Dawes, 1946; *Psilostomum spiculigerum* (Mühling, 1898) Loos, 1899; *Psilostomum oligoon* (Linstow, 1887) Braun, 1902; *Psilotrema spiculigerum* (Mühling, 1898) Odhner, 1913.

Psilotrema oligoon is oval in shape and the fore end of its body is somewhat elongated, the hind end being ended. The fluke is flat, colourless, with darker vitelline glands on the sides of the body. Body length, 1.2—1.5 mm, 1.3 mm on the average; maximum width, 0.46—0.78 mm, 0.55 mm on the average. The cuticle is covered throughout its surface with small spines, 12 μ long, most abundant on the ventral side of the body. It should be stressed that the spines easily fall out when the parasites are being prepared, so that no spines at all may be observed if a few specimens only are available. Both suckers are well-developed, spherical and of about the same size. The oral sucker, 0.144—0.175 mm in diameter, 0.168 mm on the average; the ventral sucker 0.144—0.173 mm in diameter, 0.167 mm on the average; the latter is at a distance of 0.36—0.51 mm, 0.43 mm on the average, from the fore part of the body (thus it lies on the border of the first and second thirds of the body length). The pharynx is strongly developed, well-muscled, 0.084—0.131 mm long, 0.106 mm on the average, and 0.076—0.126 mm wide, 0.099 mm on the average. No oesophagus. Thick intestinal trunks reach the hind end of the body. The excretory pore is in the hind end of the body.

Male genital organs. The testes are large, spherical or somewhat transversely oval, situated in the hind part of the body, one behind the other. Testis I is 0.166—0.242 mm in diameter, 0.219 mm on the average; testis II, 0.198—0.293 mm, 0.237 on the average. An elongated cirrus pouch, 0.363—0.451 mm long, 0.406 on the average, reaches the hind border of the ventral sucker. It contains a large seminal vesicle, 0.193—0.281 mm long, 0.236 mm on the average, and 0.068—0.093 mm wide, 0.086 mm on the average, and empties into the genital pore, situated on the left of the long axis of the body, at the height of the hind margin of the pharynx or even farther towards the front of the body.

Female genital organs. A spherical ovary, 0.109—0.164 mm in diameter, 0.135 mm on the average, lies right in front of testis I on the right of te long axis of te body. A characteristic cone-shaped processus, turned centrally and towards the end of the body goes

from the lower-central margin of the ovary. The oviduct is fairly thick; in its course, it shows a sacciform dilatation of its walls which should be regarded as a seminal receptacle. Laurer's duct apparent. The vitelline glands form large grape-like glandular accumulations; they begin in front somewhat before the ventral sucker, while at the back they reach the end of the body and fill up the free space behind testis II. The vitelline glands surround the intestinal trunks from three sides (ventral, dorsal and lateral) and cover them almost throughout their length. The transverse vitelline duct is pretty wide and lies above testes I. The uterus, very short and with no descending limb runs forward and passes in its terminal section (near the front of the ventral sucker) into the muscled part — the metraterm emptying into the genital pore. The uterus always contains few eggs, two to eight. The eggs are oval, 85—92 μ long, 89 μ on the average, and 61—65 μ wide, 63 μ on the average. They have a thin shell and an opercle at one end. Eggs are laid during the stage prior to gastrulation.

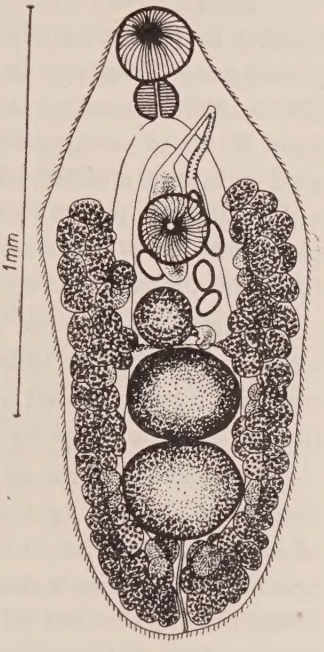

Fig. 1. *Psilotrema oligoon* (Linstow, 1887) Odhner, 1913.

Biology. The development cycle was elaborated by Mathias (1925). It is very much like the development of liver fluke for that matter. Eggs are removed with the faeces of the definitive host and get into water, where they develop into miracidia. These penetrate into the intermediate host, the snail *Bithynia tentaculata* L. The cercariae of the fluke appearing finally in the intermediate host have long been known under the name of *Cercaria tuberculata*. On leaving the snail they encyst mainly on aquatic plants. The encysted metacercariae, eaten up by the definitive host, develop into the mature form of the parasite, capable to lay eggs in a few days; according to Mathias in ducks in four days and in white mice in five to six days. The whole of the development cycle takes place in summer at a temperature of about 20°C. for at least five months.

Definitive hosts. *Psilotrema oligoon* was discovered in the small intestine of moor-hen *(Gallinula chloropus* L.), white-eyed pochard *(Nyroca nyroca* Güld.), goose *(Anser anser domesticus* L.) and, experimentally, also in duck, hen, turtle-dove and white mice.

Intermediate host: the snail *Bithynia tentaculata* L.

Pathogenicity and symptoms. It follows from an inquiry carried out at Nasiłów that an epidemics was recorded among young geese (from one to three months of age) with a high death-rate (70 to 100%) on many farms. Thus, 15 young geese out of 18 died on farm K, all 14 young geese died on farm W, just as all 9 young geese died on farm S and 21 young geese out of 24 died on farm M. Throughout Nasiłów, over 100 young geese died from May till July 1956, while old geese, as well as other domestic birds — ducks, hens, Guinea fowl and turkeys, were not affected in that period.

Nasiłów lies near the Vistula near wide river inundations on which all the geese of the village stay throughout the summer season. It may be supposed that it was on these river inundations that the invasion of the geese by this parasite occurred in spring 1956.

The post-mortems of the dead geese revealed chief anatomo-pathological changes in the small intestine, the site of the settlement of the parasite. The flukes occurred in large numbers, hundreds of specimens in a single dead bird. The mucous membrane of the small intestine was covered with abundant diphtherial sediment lining the lumen of the intestine with a continuous layer.

Histological exmination* showed cellular exudation forming focal accumulations here and there within the mucous membrane of the small intestine. Moreover local superficial lesions of tissues occured caused by their decomposition. The whole of these changes corresponds to a diphtheroidal and ulcerating inflammation of the mucous membrane of the small intestine (Fig. 1).

It follows from the inquiry that the disease was rather acute and the symptoms were sadness and weakness of the birds and diarrhoea in its initial stage. The birds usually died in a few days or recovered spontaneously and returned to normal within a few weeks.

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* The histological examination was made in the Department of Pathological Anatomy, the Veterinary Institute at Puławy.

Discussion

Linstow first described *Distomum oligoon* in 1887 as he found these flukes in the intestine of the moor-hen *Gallinula chloropus*. In his description, not too comprehensive and not supported with a drawing but giving in detail the most important features of the parasite, the author says that there are no spines on the surface of the body of the fluke. Mühling discovered in 1898 one specimen of fluke in the intestine of the white-eyed pochard *Nyroca nyroca*. It had spines on the surface of the body and he described it as *Distomum spiculigerum*. The author hesitated in his diagnosis because of the great similarity of the fluke to *D. oligoon* (and also because there was no drawing added to Linstow's description). After he got into touch with Linstow and examined the materials he decided to describe the fluke as a new species, *D. spiculigerum*. It may be assumed that what mainly distinguished these flukes from each other was the presence of spines on the body surface in *D. spiculigerum* and their absence in *D. oligoon*. When examining flukes of the species *Psilostomum* as early as 1902, Braun arrived at a firm conclusion that *D. oligoon* and *D. spiculigerum* were identical. Lühe (1909) says in his description of *P. oligoon* (based on the work by Linstow, 1887 for that matter) that the fluke is „probably identical with *P. spiculigerum*" and leaves open the question of the absence of spines in *P. oligoon*. Odhner (1913) in his work discussing the new species *Psilotrema* is inclined to separate these species for the following reasons: (1) *P. oligoon* is more elongated in shape, (2) its cirrus sac reaches only a little beyond the fore margin of the ventral sucker, while it is far longer in *P. spiculigerum;* (3) the definitive hosts of these flukes are different and so the parasites are most probably different. Mathias (1925), who examined the biology of *P. spiculigerum* gives in his work a description of this fluke (with a drawing) without however contributing anything new to the question of morphology. Following Mühling he retains the name of *P. spiculigerum* for the parasite examined. In his handbook „The *Trematoda*" Dawes (1946) identifies both species and gives the name *P. oligoon* as one of the synonyms for *P. spiculigerum*.

Having studied the original works of the above mentioned authors and having made own observations on a very wast material I have reached the conclusion that there is no need to maintain specific di-

stinction between *Psilotrema oligoon* and *Psilotrema spiculigerum*. Both species in question ought to be regarded as identical and the specific name *Psilotrema oligoon* (nomenclature of Dawes, 1946) should be accepted, while the name *Psilotrema spiculigerum* (Mühl., 1898) Odhner, 1913 is wrong on the basis of priority: Linstow's specific name is earlier (1887) than „*spiculigerum*" of Mühling (1898). That is why *P. spiculigerum* should be a synonym of *P. oligoon* and not vice-versa. The Table below and the explanations following it are meant to demonstrate my thesis on the identity of both fluke species compared.

Measurements	*P. oligoon*	*P. spiculigerum*		*P. oligoon*
	according to Linstow	according to Mühling	according to Mathias	according to author
length	1.14 mm	1.12 mm	0.7 — 1.78 mm	1.3 mm
width	0.54	0.71	0.35 — 0.87	0.55
spines	absent	present	present	present, easily fall out
oral sucker	0.18	0.18	0.140 — 0.197	0.168
ventral sucker	0.19	ca 0. 8	0.160 — 0.215	0.167
pharynx	smaller than oral sucker	0.09 × 0.133	0.09 × 0.1	0.099 × 0.106
testis I	testes spherical lying one behind the other in hind body end	0.195	0.7 — 0.14 × 0.150 — 0.25	0.219
testis II		0.195	0.7 — 0.14 × 0.150 — 0.25	0.237
ovary	—	0.144	0.140	0.135
eggs	98 × 72 μ	97 × 50 μ	86-110 × 54-74 μ	89 × 83 μ

The flukes described as *D. oligoon* by Linstow, as *P. spiculigerum* by Mühling and Mathias and as *P. oligoon* by the present author are similar in their size (the length and width of the body), the arrangement and size of both sucker, the location of the genital pore, the size and arrangement of the ovary, the structure of the uterus, the number and size of the eggs contained in it, the range of the vitelline glands, the size, shape and arrangement of the testes and the structure of other organs (pharynx, intestinal trunks, etc.). Although Linstow states lack of spines on the body-surface in his description but the difference cannot be the basis

of the separation of these two species. The present author has been able to observe a frequent secondary lack of spines in an abundant material, as they fall out during the preparation of parasites. All the remaining features of the flukes discussed quite clearly support the identity of the species *Psilotrema oligoon* and *Psilotrema spiculigerum**.

In connection with the morphology of *P. oligoon* the question still remains to be discussed of the presence or lack of the seminal receptacle both in the characterization of the family *Psilostomatidae* Odhner, 1913 and in that of *Psilotrema* Odhner, 1913.

In the series of features of the family *Psilostomatidae,* Odhner indicates lack of the seminal vesicle, while other authors find this organ in various representatives of the family. Mühling (1898) describes a seminal receptacle in *P. platyurum* (syn. *brevicolle*) and *P. simillimum.* Looss (1899) gives the presence of a small seminal receptacle in his generic diagnosis for *Psilostomum* (s. l.). Odhner (1913) claims that the seminal receptacle described by Mühling (1898) is nothing else than a dilatation of a corresponding section of the female genital ducts in which the fertilization of eggs occurs („Befruchtungsraum"). Odhner (1913) found an organ which, as he himself says, should be defined as a seminal receptacle only in one representative of the whole family *Psilostomatidae,* i. e. in *Sphaeridiotrema globulus.* Lühe (1909) includes the presence of the seminal receptacle in the characterization of *Psilostominae.* On the evidence of my own present examinations of *P. oligoon* I state the presence of a seminal receptacle in this species: in all the specimens examined occurs, irrespective of the functional condition of the genital organs, a small sacciform dilatation of the walls of the oviduct; it is an anatomical formation and has its permanent and definite lo-

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* I wish to draw the attention of the readers of Skrjabin's handbook „Trematody żiwotnych i czełowieka" to the fact that there are mistakes in the description of *Psilotrema spiculigerum* and *Psilotrema simillimum* in Volume I, which can mislead him, viz. (1) Fig. 99 on p. 239 with the caption „*Psilotrema simillimum* (Mühling, 1898)" represents *Psilotrema spiculigerum* according to the original work of Mühling (1898); (2) Figs. 100 and 101 on p. 239 with the caption „*Psilotrema spiculigerum* (Mühling, 1898)" represent *Psilotrema simillimum* according to the original work of Szidat (1937); (3) the remark contained in the footnote on p. 223 („the pharynx is smaller than the oral sucker in Fig. 99 taken from Mühling, 1898") does not apply as Figures 99 and 100 and 101 have been confused.

cation (it is no functional dilatation of the walls) and should be regarded as a seminal receptacle.

Consequently I propose to introduce in the characterization of both the family *Psilostomatidae* Odhner, 1913 and the genus *Psilotrema* Odhner, 1913 the following amendment: „seminal receptacle, present or absent".

I wish to express my gratitude to Prof. Eugeniusz Żarnowski for his help in the elaboration of the material examined and to Dr. Wojciech Karczewski of the Department of Diseases of Poultry, Veterinary Institute, Puławy, who first came across the material in the field, for his bacteriological and other tests which helped to diagnose the disease in geese.

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LITERATURE

1. Braun M. — Fascioliden der Vögel. Zool. Jahrb., Syst., 16, 1902.
2. Dawes B. — The *Trematoda*. Cambridge, 1946.
3. Linstow O. v. — Helminthologische Untersuchungen. Zool. Jb., Syst. 3, 97—114, 1887.
4. Loos A. — Weitere Beiträge zur Kenntniss der Trematoden-Fauna Aegyptens, zugleich Versuch einer natürlichen Gliederung des Genus *Distomum* Retzius. Zool. Jb., Syst. 12, 521—784, 1899.
5. Lühe M. — Süsswasserfauna Deutschlands, Heft 17, 1909.
6. Mathias P. — Sur le cycle évolutif d'un trématode de la famille *Psilostomidae* (*Psilotrema spiculigerum* Mühling). C. R. Acad. Sci., Paris, 178, 1217—19, 1924.
7. Mathias P. — Recherches expérimentales sur le cycle évolutif de quelques trématodes. Bull. Biol., 59, 1—123, 1925.
8. Mühling P. — Die Helminthen-Fauna der Wirbeltiere Ostpreussens. Arch. Naturgesch., Abt. A, 1—118, 1898.
9. Neveu-Lemaire M. — Traité d'helminthologie médicale et vétérinaire. Paris. 1936.
10. Odhner T. — Zum natürlichen System der digenen Trematoden. VI. Familie *Psilostomidae* n. fam. Zoolog. Anz., 42, 7, 289—318, 1913.
11. Skrjabin K. I. — Trematody żiwotnych i czełowieka. I. Moskwa-Leningrad, 1947.
12. Szidat L. — Ueber die Entwicklungsgeschichte von *Sphaeridiotrema globulus* Rud., 1814 und die Stellung der *Psilostomidae* Odhner im natürlichen System. I. Die Entwicklungsgeschichte von *Sphaeridiotrema globulus* Rud. Zeitschr. f. Parasitenkunde, 9, 4, 529—542, 1937.
13. Wiśniewski L. W. — O dwóch nowych progenetycznych przywrach z bałkańskich Gammaridów. Bull. Int. Acad. Polon., B, II, 7, 259—276, 1932.

STRESZCZENIE

W maju 1956 nadesłano do Instytutu Weterynarii w Puławach do badań rozpoznawczych 2 młode padłe gęsi, pochodzące z gromady Nasiłów w pow. puławskim. W jelicie gęsi stwierdzono bardzo liczne przywry należące do gatunku *Psilotrema oligoon* (Linstow, 1887) Odhner, 1913 z rodziny *Psilostomatidae* Odhner, 1913. Z danych piśmiennictwa wynika, iż występowanie tych przywr jest rzadkością. Linstow (1887) stwierdził je w jelicie kurki wodnej — *Gallinula chloropus;* Mühling (1898) — w jelicie podgorzałki — *Nyroca nyroca;* Mathias (1925) wyhodował eksperymentalnie u kaczki, kury, turkawki i białej myszy.

Przeprowadzone badania anatomo-patologiczne, bakteriologiczne oraz koprologiczne wykluczyły możliwość innej przyczyny zejścia śmiertelnego tych gęsi poza masową inwazją przywr z gatunku *Psilotrema oligoon.*

Z wywiadu przeprowadzonego na terenie gromady Nasiłów okazało się, iż w wielu gospodarstwach miały miejsce masowe zachorowania młodych gęsi, w wieku 1 do 3 miesięcy, przy czym śmiertelność była bardzo wysoka — 70 do 100%. Ogółem w całej gromadzie padło w okresie od maja do lipca 1956 ponad 100 młodych gęsi. Choroba ta odznaczała się dość ostrym przebiegiem przy objawach osłabienia i posmutnienia ptaków oraz biegunki w początkowym jej okresie. Zwykle po kilku dniach następowało zejście śmiertelne, a w bardzo rzadkich przypadkach — samowyleczenie. Gęsi stare, jak również inne ptaki domowe, nie chorowały w tym okresie.

Zmiany anatomo-patologiczne dotyczyły przede wszystkim przewodu pokarmowego, przedstawiając obraz dyfteroidalno-wrzodziejącego zapalenia błony śluzowej jelita cienkiego.

Przywry, których szczegółowy opis podano w tekście angielskim, charakteryzują się drobnymi wymiarami (niewidoczne okiem nie uzbrojonym przy wykonywaniu sekcji). Powierzchnia ciała pokryta jest drobnymi kolcami, obydwie przyssawki są dobrze rozwinięte, jednakowej wielkości, przy czym przyssawka brzuszna znajduje się w przedniej części ciała, gardziel silnie rozwinięta, jądra duże, kuliste leżą w tylnej części ciała, jajnik znajduje się po stronie prawej oraz ku przodowi od I jądra, macica zawiera zawsze nieliczne tylko jaja — 2 do 8.

Cykl rozwojowy *P. oligoon* odbywa się przy współudziale jednego żywiciela pośredniego — ślimaka *Bithynia tentaculata* L.

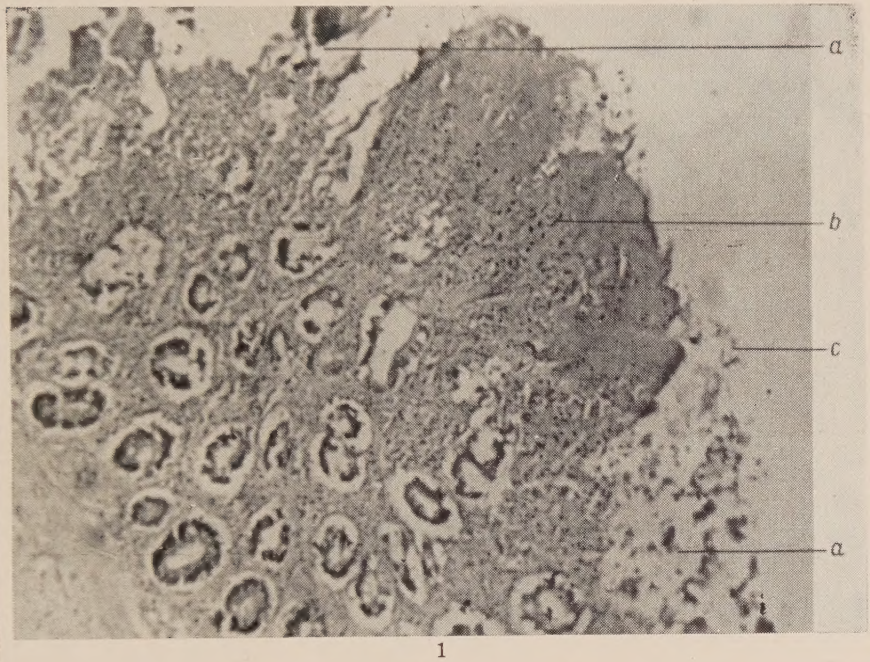
W dyskusji podano uzasadnienie identyczności gatunku *Psilotrema oligoon* i *Psilotrema spiculigerum*. Mianowicie, na podstawie oryginalnych prac autorów opisujących te przywry oraz własnych badań związanych z wystąpieniem opisywanej enzootii u gęsi, autor stwierdza, iż utrzymywanie odrębności gatunkowej *P. oligoon* i *P. spiculigerum* jest niesłuszne.

Autor proponuje ponadto wprowadzenie następującej poprawki do charakterystyki rodziny *Psilostomatidae*, jak również rodzaju *Psilotrema:* „receptaculum seminis jest lub brak". Wprowadzenie tej poprawki uzasadnia się występowaniem zbiornika nasiennego u *Psilotrema oligoon* oraz stwierdzeniem obecności tego narządu przez innych autorów u niektórych przywr z rodzaju *Psilotrema* i rodziny *Psilostomatidae*.

PLATE I

Phot. 1. Histological changes of the mucous membrane of the small intestine of geese. a. lessions of tissues; b. cellular exudation; c. rests of the diphtherial sediments.

Phot. 2. Terrain of the supposed invasion of geese with *Psilotrema oligoon* (Vistula inundation).



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M. Wertejuk auctor phot.